the symptoms only, unless the patient happened to die during the acute state of the malady and while its effects are still present."

Further on he says: "I have met with several instances in which enlargement of the liver has come on, and more than one in which jaundice has come on, soon after the disappearance of the rash and scarlatina; but I have never had an opportunity of inspecting the liver in a case of this kind. It is most probable that the disease of the liver is analogous to the disease of the kidney which so often occurs in scarlatina after the disappearance of the rash, and that the enlargement of the liver results from rapid development and shedding of the secreting cells caused by the elimination of some noxious matter through the gland."

The occurrence of palpable tumors (of about the size of a walnut) of the liver, which again disappear with the inflammation, is, however, not mentioned either by Budd or by Frerichs. Nevertheless, I believe that we have to deal here with a similar process.

The fact that distinctly palpable tumors of the liver may occur, existing only a few days in order to disappear again, must be of interest in a high degree, the more so as they cannot be differentiated by palpation from malignant or gummatous tumors. If, therefore, we meet such tumors in a patient suffering from fever, it is best to wait with the diagnosis of cancer or gumma of the liver until further observation permits a definite diagnosis.

VOLUMETRIC DETERMINATION OF THE PURIN BODIES (URIC ACID AND THE PURIN BASES) IN URINE.[1]

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and

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The object of this paper is to describe an exact and clinical method of determining the uric acid and the purin bases in the urine. A great many methods have been devised for this purpose, the simpler ones being, as a rule, inaccurate, and the more exact ones of a complex nature requiring a great deal of time and a degree of technical skill not possessed by the average practitioner of medicine.

All the more exact methods are founded upon the property of uric acid and the purin bases of forming definite compounds with silver in an ammoniacal solution of the latter in the presence of neutral salts of the alkaline and alkaline earth group, preferably chloride of magnesium, chloride of lithium, or chloride of ammonium. Under the above conditions uric acid combines with silver in the proportion of one molecule of the former and one atom of the latter; the purin bases in the proportion of two molecules of xanthin to one of silver. The compound of silver urate formed under the above conditions is, as we shall show later, insoluble in both weak and strong ammonia up to 1: 200,000 parts. The compounds of silver and purin bases are soluble in strong ammonia, insoluble in weak ammonia.

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[1] Read before the New York County Medical Society, March 28, 1904.

In the standard method of Ludwig-Salkowski the procedure is as follows: A known quantity of urine is precipitated by a solution of silver in an ammoniacal magnesium mixture; the precipitate after being carefully washed out is decomposed by sodium sulphide, which separates the silver from the uric acid and purin bases as an insoluble sulphide of silver and dissolves the purin bodies. This solution is treated with weak hydrochloric acid, thus separating the uric acid, which crystallizes out after twenty-four hours, leaving the purin bases in solution. The uric acid is then weighed.

For the determination of the purin bases the solution that has been filtered off from the uric acid is treated with an ammoniacal solution of silver, which precipitates the purin bases as purin silver. After washing out this precipitate the silver is determined either by the method of Vohlhard or by ignition and weighing the residue, and thus the amount of the purin bases is determined.

We have omitted to describe all the necessary precautions in this analysis, but one can well imagine what a tedious and long process it is, and, as will be shown later by our experiments, some grave errors are scarcely to be avoided.

Another method of analysis, in view of the facts already mentioned (that the compounds of the purin bodies with silver are definite), is to determine the silver in the precipitate. This method —Haycraft's—is a fairly good one, but, as Huppert says, requires a great deal of skill and precision.

Instead of determining the silver in the precipitate the attempt has been made by Denigès and Czapek to proceed, as above mentioned, with a known amount of silver and to determine the excess of silver in an aliquot part of the filtrate. Denigès used potassium cyanide and Czapek used potassium sulphide. In both methods, and especially the latter, the solution used for titration is unstable and the titre requires to be verified very often. In addition, in the methods of Haycraft, Denigès, and Czapek, the total amount of purin bodies is determined. For the determination of uric acid these methods are not applicable.

Our method is also founded upon the titration of the excess of silver added. It differs from that of Denigès and Czapek in the following respects: For titration we use a solution of potassium iodide, the titre of which is unchangeable; and, secondly, having by experiments found that silver urate in strong ammonia solutions is insoluble, and that the silver compounds which the purin bases form in the same menstruum are soluble, we are enabled to determine both these bodies by the same procedure.

REQUIREMENTS.

(1) $\frac{N}{50}$ Ag solution.
(2) $\frac{N}{50}$ KI solution.
(3) A nitrous-sulphuric acid mixture.
(4) Starch solution.
(5) NH_4OH. Sp. gr. 0.90.

1 c.c. $\frac{N}{50}$ Ag solution = 0.00336 gr. uric acid = 0.00152 gr. purin base, calculated as xanthin.

The $\frac{N}{50}$ Ag solution is prepared by dissolving 3.3932 grms. $AgNO_3$ previously heated to 120° C. for ten minutes in water, adding 75 c.c. NH_4OH (sp. gr. 0.90) and 10 grms. NH_4Cl and diluting to 1 L. Crystals of pure $AgNO_3$ can be obtained in the market.

The $\frac{N}{50}$ KI solution is prepared by dissolving 3.3200 grms. KI previously heated to 180° C. in water and diluting to 1 L. KI free from iodate, chlorides, and sulphate can be readily obtained.

The nitrous-sulphuric acid mixture is prepared by adding 25 c.c. concentrated H_2SO_4 to 75 c.c. of H_2O and then adding 1 c.c fuming nitric acid.

The $\frac{N}{50}$ solutions are stable, the titre remaining constant after several months, provided the ordinary precautions in preserving silver solutions are observed.

METHOD. *To Determine Uric Acid.* To 110 c.c. of urine add 55 c.c. $\frac{N}{50}$ Ag solution and dilute with NH_4OH (sp. gr. 0.90) to 220 c.c. All these measurements can be conveniently made in flasks of the Giles pattern. Mix and filter through a dry folded filter, either at once or after standing a few minutes. Two portions of 100 c.c., each of which corresponds to 50 c.c. of urine, are collected.

In the mean time a half-dozen small test-tubes (about 8 cm. long and 1 cm. in diameter) are filled for about 1 cm. with a mixture of, roughly, two parts of the nitrous-sulphuric acid and one part starch solution.

To one of the above portions of 100 c.c., $\frac{N}{50}$ KI is rapidly added, and after each addition of 2 c.c. a small portion, not exceeding 0.5 c.c., is removed by means of a pipette, which also answers as a stirring rod, and carefully introduced down the side of one of the test-tubes in such a manner that two absolutely distinct layers are formed. The end reaction manifests itself sharply by the formation of a blue ring (iodide of starch) at the point of juncture. Having now found the end point approximately with the first 100 c.c., the exact end point is determined with the second 100 c.c.—*e. g.*, say that more than 10 c.c. and less than 12 c.c. are required with the first 100 c.c. The second 100 c.c. are then taken, and 10 c.c. $\frac{N}{50}$ KI run into the solution at once; then a few drops at a time are carefully added, until the exact end point is reached. With a little practice the exact end point can be obtained without having removed more than 1 c.c. from the solution being tested. The entire analysis need not require more than from twenty to twenty-five minutes.

To Determine the Purin Bases. Exactly the same process is carried out except that instead of adding strong NH_4OH we dilute with water—*i. e.*, take 110 c.c. of urine, add 55 c.c. $\frac{N}{50}$ Ag and dilute with water to 220 c.c. and proceed as before. The number of c.c. of $\frac{N}{50}$ Ag used equals the total purin bodies, and, subtracting the number of c.c. of $\frac{N}{50}$ Ag required in the uric acid determination, the difference equals the purin bases. For example:

Determination of Uric Acid.

110 c.c. urine taken; 55 c.c. $\frac{N}{50}$ Ag added; 55 c.c. NH_4OH 0.90 added; 220 c.c. final dilution.

100 c.c. filtrate = 50 c.c. urine = 15.9 c.c. $\frac{N}{50}$ KI less 0.3 c.c. correction;

25.0 $\frac{N}{50}$ Ag added − 15.6 = 9.4 $\frac{N}{50}$ Ag used.

9.4 × 0.00336 = 0.0316 grm. uric acid in 50 c.c. urine, from which the amount in twenty-four hours is calculated.

Determination of Purin Bases.

110 c.c. urine taken; 55 c.c. $\frac{N}{50}$ Ag added; 55 c.c. water added; 220 c.c. final dilution.

100 c.c. filtrate = 50 c.c. urine = 14.2 c.c. $\frac{N}{50}$ KI less 0.3 c.c. correction = 13.9 c.c.

This 100 c.c. contained 25 $\frac{N}{50}$ Ag added; 11.1 $\frac{N}{50}$ Ag used less 9.4 uric acid Ag = 1.7 purin bases Ag.

0.00152 × 1.7 = 0.0026 grm. xanthin in 50 c.c. urine, from which the amount in twenty-four hours is calculated.

PRECAUTIONS NECESSARY. 1. It is necessary in making the test for iodine that the solutions should be absolutely cold, and it is preferable to place the test-tubes in ice-water.

2. The end reaction can be best observed most accurately in daylight.

3. Many urines, if added to the nitrous-sulphuric acid mixture

and tested by the contact method will develop a reddish-colored ring at the point of contact. This color is due to the action of the acid on the coloring matter of urine, and must not be confounded with the distinctly blue ring produced when iodine is present. The reddish ring becomes apparent only when working with the weak ammoniacal solution, for in the strong ammoniacal solution the AgI precipitates more rapidly, is of a white color and not yellowish, and consequently sets off the blue ring by contrast. If doubt exists as to the nature of the ring it is only necessary to gently shake the test-tube without causing the liquids to mix completely; under these conditions the reddish ring becomes entirely dissipated, whereas the blue iodine ring becomes more distinct.

4. If the relationship of the standard solutions is determined under the same conditions as those under which the analyses with urine are carried out, it will be found that 0.3 c.c. more of the $\frac{N}{50}$ KI will be required to develop the end reaction than the number of c.c. of $\frac{N}{50}$ Ag used. This is owing to the fact that there is a limit to the delicacy of the test for iodine, and that it is necessary to add 0.2 c.c. $\frac{N}{50}$ KI to 100 c.c. H_2O in order that 0.5 c.c. of this dilution should give the reaction for I. When we remember that this 0.5 c.c. contains only 0.00332 mgr. of KI the extreme delicacy of the end reaction as performed by the contact method is appreciated.

Rogovin[1] has recently shown that the $HNO_2+H_2SO_4$ test is the most delicate test for I. We came to this same conclusion independently, but found that by the contact method we could increase the delicacy of the reaction to a marked degree. The $\frac{N}{50}$ Ag and $\frac{N}{50}$ KI should therefore be standardized, using approximately the same dilution (100 c.c.) as in the analysis of urine, and the necessary correction obtained, which will be 0.3 to 0.4 c.c. if the solutions have been accurately prepared.

In order to prove the accuracy of our method in determining both uric acid and the total purin bodies, the following points were established experimentally:

1. That the Ag compound formed with uric acid under the conditions stated is insoluble both in dilute and in strong NH_4OH solutions.

2. That the Ag compound formed with the purin bases under the conditions stated is insoluble in weak ammoniacal solution and soluble in strong NH_4OH.

3. That known amounts of uric acid, when added either to water alone or to urine, can be accurately determined. This was shown

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[1] Berliner klin. Wochenschr., 1903, S. 863.

to be the case under varying conditions and with uric acid from various sources.

4. That the uric acid determinations agree with determinations made by the Ludwig-Salkowski method.

5. That the determinations of the total purin bodies agrees with the results obtained by Arnstein's modification of Camerer's method.

6. That Ag can be determined with great accuracy by means of KI in an ammoniacal solution.

We shall in a separate paper publish a comparison of the accuracy of this means of determining silver as compared with other volumetric methods.

Experimental Part. (1) *With Uric Acid.* The uric acid which was used was obtained from three sources: two were commercial products and one was obtained from urine. The purity of one of the commercial products (A) was established by nitrogen (Kjehldal) determinations, as follows:

	Per cent. Found.	Per cent. Calculated.
0.0814 gr. yielded 0.0269 gr. N	33.06	33.33
0.0952 gr. yielded 0.0316 gr. N	33.20	

The second commercial product (B) was purified by recrystallization and the uric acid from urine (C) was purified by washing with alcohol and repeatedly recrystallizing till an almost colorless product was eventually obtained.

Solubility of the Precipitate which Uric Acid Forms with an Ammoniacal Solution of Silver Containing Ammonium Chloride. 0.100 gr. of uric acid (A) was dissolved in 10 c.c. of a cold saturated solution of $LiCO_3$ and diluted to 100 c.c. This solution is designated "D." The solubility was determined both in water and in urine. A urine free from all purin bodies was prepared by precipitating these bodies by means of Salkowski's ammoniacal silver solution and then adding only enough NH_4OH to dissolve the AgCl formed. In each case the final dilution was 50 c.c., and this contained 2 c.c. of the $\frac{N}{50}$ Ag solution.

Solubility in Water.

Solution "D" added . .	1.00 c.c.	0.5 c.c.	0.25 c.c.
Uric acid	1.00 mg.	0.5 mg.	0.25 mg.
Corresponding to 1 part in	50,000	100,000	200,000
Result	Marked precipitate.	Slight precipitate.	Very slight precipitate, readily noticeable on standing eighteen hours.

	Containing 25 per cent. NH_4OH.		Sp. gr. 0.90.
Solution "D" added . .	1.00 c.c.	0.5 c.c.	0.3 c.c.
Uric acid	1.00 mg.	0.5 mg.	0.3 mg.
Corresponding to 1 part in	50,000	100,000	167,000
Result	Slight precipitate.	Very slight precipitate which collects after eighteen hours.	Turbidity which settles as a precipitate after eighteen hours.

Solubility in a Purin-free Urine.

Solution "D" added	1.0 c.c.	0.5 c.c.	0.25 c.c.
Uric acid in	1.0 mg.	0.5 mg.	0.25 mg.
Corresponding to 1 part in	50,000	100,000	200,000
Result	Marked precipitate.	Precipitate.	Slight precipitate.

	Containing 25 per cent. NH_4OH.		Sp. gr. 0.90.
Solution "A" added	1.0 c.c.	0.5 c.c.	0.25 c.c.
Uric acid in	1.0 mg.	0.5 mg.	0.25 mg.
Corresponding to 1 part in	50,000	100,000	200,000
Result	Precipitate.	Slight precipitate.	Turbidity which settles as a precipitate in eighteen hours.

The results show that in urine, whether in a weak or strong ammoniacal solution, the silver urate precipitate is less soluble than 1 part in 200,000; or, in other words, so slight as to be negligible. The same is practically true of aqueous solutions.

Solubility of the Silver Precipitate Formed by the Purin Bases in NH_4OH in the Presence of Urine. The purin bases were separated from 1000 c.c. of urine according to the method of Salkowski.[1] The acid solution (E) containing these bases, which probably also contained a trace of uric acid, was diluted to 100 c.c.

A urine from which all the purin bases had been removed was used in making the following tests:

Twenty c.c. of solution E containing the purin bases were added to 200 c.c. of the purin-free urine (F). A small quantity of $\frac{N}{50}$ Ag solution was then added and a voluminous precipitate obtained. The same experiment was repeated, except that enough NH_4OH of specific gravity 0.90 was added to form 25 per cent. of the final dilution. Under these conditions instead of a voluminous precipitate being formed, only a slight turbidity was produced, thus proving that the purin bases are practically entirely held in solution in an NH_4OH solution of this strength, and are perhaps entirely soluble, since the turbidity obtained was in all probabliity caused by the trace of uric acid which the solution used contained.

In the presence of solutions containing less than 25 per cent. NH_4OH, the purin bases are progressively less soluble. The same results have been obtained in control experiments. Moreover, it is a fact that although the precipitate of the Ag compound can readily be prevented if sufficient NH_4OH be present, it is much more difficult to dissolve this precipitate if once formed in a weak NH_4OH solution, even though strong NH_4OH is then added in large excess.

DETERMINATION OF URIC ACID IN AQUEOUS SOLUTIONS. In the following experiments the commercial uric acids "A" and "B" and the uric acid from urine "C" were used as indicated. As a rule, the uric acid was dissolved in 15 to 20 c.c. of a saturated solution of $LiCO_3$ in the cold. In a few instances Na_2CO_3 was used, in which cases the solution was slightly warmed.

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[1] Pflüger's Archiv, 1898, Bd. lxix. p. 280.

Fifty-five c.c. $\frac{N}{50}$ Ag were invariably added. In some cases which are indicated the precipitation was made in the presence of 55 c.c. NH_4OH, specific gravity 0.90. The final dilution was always 220 c.c., and the determinations were made in two portions of 100 c.c. each.

Number of experiment.	Source of uric acid used.	Total uric acid dissolved.	Solvent used.	$\frac{N}{50}$ Ag required for 100 c.c.	Uric acid found.	Uric acid added.
1	A	0.1133 gr.	$LiCO_3$	15.3 c.c.	0.0514 gr.	0.0515 gr.
2	A	0.1110 "	"	14.8 "	0.0497 "	0.0505 "
3	A	0.1007 "	"	14.1 "	0.0474 "	0.0455 "
4	A	0.1248 "	"	17.3 "	0.0581 "	0.0567 "
5	A	0.1003 "	"	13.7 "	0.0460 "	0.0456 "
6	A	0.1200 "	"	16.6 "	0.0556 "	0.0545 "
7	B	0.0517 "	Na_2CO_3	7.1 "	0.0238 "	0.0235 "
8	B	0.1057 "	$LiCO_3$	14.1 "	0.0474 "	0.0480 "
9	B	0.1255 "	"	16.8 "	0.0564 "	0.0570 "
10	C	0.0908 "	Na_2CO_3	12.0 "	0.0403 "	0.0412 "
11	B	0.1098 "	$LiCO_3$	14.6 "	0.0491 "	0.0499 "
12	B	0.1015 "	"	13.4 "	0.0450 "	0.0461 "

In No. 11 and No. 12 precipitation was made in the presence of 25 per cent. NH_4OH, specific gravity 0.90.

The uric acid "A," as previously indicated, was not a recrystallized product, which probably accounts for the slight plus error found in several instances.

DETERMINATION OF URIC ACID DISSOLVED IN A URINE FROM WHICH THE PURIN BODIES HAD BEEN PREVIOUSLY REMOVED. The purin bodies were removed from a urine by adding Salkowski's Ag solution in excess and sufficient NH_4OH to dissolve all AgCl. After filtering the urine was acidified with HNO_3, allowed to stand, and the AgCl filtered off. In order to confirm the fact that the urine now contained neither purin bodies nor silver, a definite quantity of $\frac{N}{50}$ Ag solution was added, and this titrated with the $\frac{N}{50}$ KI under the exact conditions in which the following analyses with definite quantities of uric acid were made, with the result that the correct agreement in the titre was found.

The uric acid "A" was invariably dissolved in 10 to 20 c.c. of a saturated solution of $LiCO_3$ in the cold; 55 c.c. $\frac{N}{50}$ Ag solution were then added, followed by about 90 c.c. of the purin-free urine and 55 c.c. NH_4OH, specific gravity 0.90. The solution was diluted finally to exactly 220 c.c. with the same urine. The solution thus contained 25 per cent. of strong NH_4OH. As usual, two portions of 100 c.c. each were filtered off and the determinations made with these two solutions.

Number of experiment.	Total uric acid dissolved.	$\frac{N}{50}$ Ag required.	Uric acid found in 100 c.c.	Uric acid added in 100 c.c.
1	0.1095	14.7	0.0494	0.0498
2	0.1006	13.5	0.0456	0.0457
3	0.1030	14.0	0.0471	0.0468
4	0.1290	17.3	0.0581	0.0586
5	0.0824	11.2	0.0376	0.0375
6	0.1021	13.6	0.0457	0.0464
7	0.0595	7.9	0.0265	0.0270

No. 7 was a uric acid from urine.

Comparison of the New Method with the Ludwig-Salkowski Method. The Ludwig-Salkowski method has by common consent been accepted as the standard method for determining uric acid in urine. The method, however, is far from being an ideal one aside from the time factor. Leaving out of account entirely minor errors for which corrections can be made, or which with care may partially be avoided, there are, in addition, certain gross errors which can materially affect the results obtained.

Geelmuyden[1] has shown in a series of fourteen determinations that invariably a lower result is obtained by making nitrogen determinations on the uric acid as eventually separated in the course of the method than by weighing the precipitate. The differences in the two procedures amounted to as much as 22.4 per cent. in one case, and the average difference found was 9.3 per cent. It is true that Geelmuyden weighed the uric acid in the objectionable paper filter and did not remove the sulphur from the precipitate, yet these points alone do not account for the marked discrepancy found.

Again, the Ludwig-Salkowski method depends upon a weak HCl solution to finally separate the uric acid from the purin bases.[2] It is, however, a fact[3] that both xanthin and guanin are soluble with difficulty even in strong HCl, consequently in a urine which contains these substances in comparatively large amounts the uric acid thus separated will be contaminated by them and the result vitiated to this extent.

In the following analyses the Ludwig-Salkowski method was followed as described in Huppert's work. One modification was made in regard to the final weighing of the uric acid.

It was our experience that instead of it being the exception that Ag_2S should separate with the uric acid, this was rather the rule; moreover, the amount was quite appreciable. Thus, in two cases in which the amount was determined, we found 7.9 mg. and 11.1 mg. To remove this Ag_2S by means of alkali hydrate, as has been proposed, would introduce as great an error by the decomposition of the uric acid as the one it was intended to correct. For this reason, acting upon the advice of Dr. E. E. Smith, we collected the uric acid in a Gooch crucible, and after drying to constant weight ignited and calculated the uric acid by the loss in weight. Although by this means we do not entirely eliminate the error due to contamination by Ag_2S, since the sulphide is converted into oxide, still the error is reduced to a minimum.

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[1] Zeitsch. f. Analyt. Chem., 1892, 31, 160.

[2] Salkowski's Pract., S. 251.

[3] Huppert in Neubauer und Vogel Analyse des Harno, 1898, pp. 338, 344, 350.

In the following analyses it will be seen that in most cases the agreement between the Ludwig-Salkowski method and the new method is close, but that in some cases considerably more uric acid is found by the Ludwig-Salkowski method. This, we believe, is due to the fact, as pointed out above, that in the Ludwig-Salkowski method the uric acid can easily become contaminated by some of the more insoluble purin bases, should these be present.

In each case 100 c.c. were used in carrying out the Ludwig-Salkowski method. The new method was followed as previously described.

Analysis number.	Uric acid by new method in 100 c.c.	Uric acid by Ludwig-Salkowski method in 100 c.c.	Description of urine used.
1	0.0598 gr.	0.0609 0.0612	Normal.
2	0.0437 "	0.0436	Normal of pregnancy.
3	0.0504 "	0.0506	Normal of pregnancy.
4	0.0961 "	0.0964 0.0992	Leukæmic.
5	0.1015 "	0.1040 0.0994	Leukæmic.
6	0.0745 "	0.0758	Enteric fever.
7	0.1008 "	0.1027	Tubercular pneumothorax.
8	0.0658 "	0.0744 0.0701	Normal.
9	0.0370 "	0.0413	Leukæmic.
10	0.0631 "	0.0687	Normal.

Determination of the Total Purin Bodies. *Comparison of the New Method with Arnstein's Modification of Camerer's Method.*[1] In this method the purin bodies are determined by making nitrogen (Kjehldal) determinations on the silver precipitate, care having been taken to remove the last traces of NH_4OH from the precipitate by boiling it with water and magnesia. In the following analyses the total purin bodies were calculated as uric acid.

A comparison of the results obtained based on the uric acid is sufficiently accurate for all practical purposes. Since, however, in the one case we calculate the uric acid from the N content, and in the other case from the Ag content, a strictly accurate comparison is impossible, in view of the fact that we are dealing with a heterogeneous mixture.

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[1] Zeitsch. f. Physiol., 1897, Ch. 23, 426; Med. Wissensch., 1898, 15, 257.

Number of analysis.	Total purin bodies by Arnstein's modification of Camerer's method in 100 c.c. urine.	Total purin bodies by new method in 100 c.c. urine.
1	0.0816 gr.	0.0846
2	0.0777 0.0787 "	0.0793
3	0.0814 "	0.0852
4	0.0651 0.0661 "	0.0665

Determination of the Total Purin Bodies in Urines to which Known Amounts of Uric Acid had been Added. The total purin bodies were determined in a urine by the new method as previously described, and the result calculated as uric acid.

To 110 c.c. of the same urine a definite quantity of uric acid dissolved in a cold saturated solution of $LiCO_3$ was then added, the purin bodies precipitated by 55 c.c. $\frac{N}{50}$ Ag solution, and the final dilution brought up to 220 c.c. with water. The determinations were then made as before in two portions of 100 c.c. each, and the results calculated as uric acid.

Experiment number.	Purin bodies in 50 c.c. urine.	Uric acid added to this urine.	Total purin bodies found in 100 c.c.	Uric acid actually added to 100 c.c.	Uric acid found.
1	0.0302	0.0922	0.0736	0.0419	0.0424
2	0.0302	0.0823	0.0675	0.0374	0.0374
3	0.0356	0.0752	0.0708	0.0342	0.0352

No. 3 contained uric acid obtained from urine.

In conclusion, we will call attention to the following points: We found that a few drops of chloroform added to urine will prevent decomposition of the purin bodies. In several instances a urine to which chloroform had been added gave the same result after standing seventy-two hours as was obtained originally.

If the urine contains a uric acid deposit this should be brought into solution either by warming, or, what will usually be found necessary, by dissolving this deposit in a small quantity of a saturated solution of $LiCO_3$.

If a urine contains KI this must be removed by adding $AgNO_3$ in excess and then a chloride to remove the excess of Ag.

Albumin and sugar apparently exert no deleterious influence.

The method as proposed deserves the designation of "a clinical method" in the sense that it places at the disposal of the clinician an accurate method for the determination of both the total purin bodies and the uric acid, determinations that can be made in a short period of time—far shorter than by any of the numerous other methods that have been proposed. On the other hand, the term "clinical method" is looked upon by chemists, not without good reason, as a term indicating a method grossly inaccurate, and in this sense the method does not deserve to be known as a clinical method.